National Library of Canada
Acquisitions and Bibliographic Services Branch
395 Wellington Street
Ottawa, Ontario
K1A 0N4

Bibliothèque nationale du Canada
Direction des acquisitions et des services bibliographiques
395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

Canada

UNIVERSITY OF ALBERTA

# TESTING AFFECTIVE MEMORY IN COGNITIVELY IMPAIRED NURSING HOME RESIDENTS

BY

B. GWENN TERLETSKI

©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE.

DEPARTMENT OF PSYCHOLOGY

Edmonton, Alberta
FALL 1994

National Library of Canada
Bibliothèque nationale du Canada

Acquisitions and Bibliographic Services Branch
Direction des acquisitions et des services bibliographiques

395 Wellington Street
Ottawa, Ontario
K1A 0N4

395, rue Wellington
Ottawa (Ontario)
K1A 0N4

Your file Votre référence

Our file Notre référence

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-95121-4

Canada

UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: B. Gwenn Terletski

TITLE OF THESIS: Testing Affective Memory in Cognitively Impaired Nursing Home Residents

DEGREE: Master of Science

YEAR THIS DEGREE GRANTED: 1994

Permission is hereby granted to the University of Alberta Library to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as hereinbefore provided neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatever without the author's written permission.

Terletski

71 Shannon Way, S.W.
Calgary, Alberta
T2Y 2B1

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled TESTING AFFECTIVE MEMORY IN COGNITIVELY IMPAIRED NURSING HOME RESIDENTS submitted by B. GWENN TERLETSKI in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE.

Dr. Allen Dobbs

Dr. Don Kuiken

Dr. Michael Gillespie

## Abstract

Although severe cognitive deficits are associated with dementia, anecdotal evidence suggests that memories for affect-laden social interactions may remain relatively stable. To test this possibility, two levels of dementia patients (level 1 = low impairment, level 2 = high impairment) were asked to discriminate old from new videotaped conversations depicting anger, happiness or neutrality. Across levels, performance on affect-laden items remained relatively stable and was significantly greater than performance on neutral items, but performance on neutral items significantly decreased for level 2 individuals. These results suggest that dementia patients can perform an affect-laden task involving primary emotions when the combined components (social interactions, affective information) have high "magnification advantage" (Tomkins, 1992). The possibility that the results are a function of retained abilities within a "transitional system" is discussed.

TABLE OF CONTENTS


| | Page |
|---|---|
| Introduction | 1 |
| Pilot Data | 29 |
| Conversations | 29 |
| Videotapes | 32 |
| Emotion Ratings | 36 |
| Test Design | 39 |
| Experimental Data | 47 |
| Method | 47 |
| Results | 50 |
| Discussion | 60 |
| Appendices | 79 |

# LIST OF TABLES


| | | Page |
|---|---|---|
| Table 1 | Order of Presentation of Stimulus Items Across Subgroups | 42 |
| Table 2 | Correlations Among Variables | 52 |
| Table 3 | Mean Recognition Scores on Variables by Level of Impairment | 55 |

## LIST OF FIGURES


| | | Page |
|---|---|---|
| Figure 1 | Mean recognition as a function of stimulus item type and affective content. | 57 |

# Testing Affective Memory in Cognitively Impaired Nursing Home Residents

It is common knowledge that with the progression of dementia, individuals lose the ability to recognize family and friends with whom they have interacted extensively, as well as acquaintances with whom they have interacted only one or twice. However, family members and facility caregivers often report that some dementia patients become animated when a previously well-known person visits or telephones. Despite such indirect evidence of recognition abilities, when asked specifics about the person or event, individuals with dementia are unable to respond.

Experiences with well-known others generally involve some form of social interaction. A major component of social interaction is affect, which is transmitted both verbally and nonverbally, the latter carrying the principal affective information (Zajonc, 1980, 1984). Thus, although the foregoing evidence that some recognition memory abilities are retained is anecdotal, some individuals with dementia may be able to recognize particular events involving affect-laden social

interactions, despite other, documented deficits in recognition memory.

It is generally accepted that recognition memory requires the separate, yet additive combination of two conjointly occurring processes, familiarity and recollection (retrieval), which make an event distinctive enough to activate the appropriate trace and produce complete identification (Mandler, 1980). Failures in recognition memory usually reflect deficits in the recollection component (e. g., Glass & Holyoak, 1986; Graf & Mandler, 1984; Jacoby, 1991; Jacoby, Lindsay, & Toth, 1992; Mandler, 1980; Morris & Kopelman, 1986), which requires active search, comparison and organization (Mandler, 1980).

However, failures in recognition memory sometimes may reflect deficits in the familiarity component that are due to variations in encoding conditions (Tulving, 1981). During encoding, a unique trace of the event must be established. Successful recognition depends on the properties of the trace (e. g., contextual features) as well as the information available at test phase (Tulving, 1979).

The "generally accepted" conception of recognition may be limited because it does not properly address the complexities of feeling. Tomkins (1992) presents a model that suggests the semi-independence of cognitive and affective precessing. His theory will be used to clarify how a two system view can aid in understanding recognition memory in people with dementia. Tomkins (1992) discusses cognitive information processing in terms of traces, comparisons and organization. He is not explicit about whether encoding and retrieval have the same processing requirements or whether each process is distinct but integral to recognition. Nonetheless, his characterization of cognitive information processing places considerable emphasis on encoding conditions.

Specifically, Tomkins (1992) posits that cognitive information pertaining to an event is transformed via compression into a miniature analogue of that information. Compression involves the extraction of present information that is similar to information extracted from past experiences, thereby facilitating categorization and reducing the amount of new information to be remembered. Over time, as the

number of experiences with somewhat similar and somewhat different events increases, the amount of information required to identify a category decreases (efficiency) and the amount of information within the category increases (power). The greater the ratio of efficiency to power for this well-known information, the greater the "information advantage" and subsequent retrieval (Tomkins, 1992). The concept of information advantage may be consistent with Tulving's (1979, 1981) unique trace requirement at acquisition.

Tomkins (1992) further suggests that for an event to be recognized as distinct, the miniature analogue must be expanded to reproduce the original information to facilitate comparison. His notion of expansion suggests that comparative processes at retrieval are also necessary for recognition to occur, which supports Mandler's (1980) views on retrieval. In addition, the reproduction of the analogue is triggered by the external stimulus which bears the "name" relevant to the internal analogue. The external name conjoins two referents: a) a general referent, which activates a trace to the general analogue location, and b) a specific referent, which activates a trace to the

specific location. The name itself may be any symbol, etc. which a) represents all or part of the stored information, b) is similar to all or part of the information, or c) is a compression of all or part of the information (Tomkins, 1992). Therefore, if transformation at encoding was such that information advantage is high, it is more likely that the name will activate the correct trace. Perhaps Tomkins (1992) is suggesting that when the unique encoding trace is established (Tulving, 1981) and the relevant retrieval name is given to facilitate analogue reproduction, via comparison and other retrieval processes (Mandler, 1980), recognition will likely occur.

Furthermore, Tomkins (1992) suggests that affective information is processed differently than cognitive information because the transformation of affective information involves the amplification of abstract, general feelings. The degree of amplification depends on the degree of affect density, which is the product of affect intensity, duration and frequency. The greater the density, the greater the amplification of the abstraction. Moreover, affective information can become more concrete and specific, and thus, more powerful, the

more it is combined with cognitive information (Tomkins, 1992). The conjoining of affective and cognitive information produces scripts containing rules for the generation of organized affect-laden scenes. The memorability of any particular scene is very limited. However, with increased repetition of similar/different affect-laden scenes, a specific scene becomes more memorable each time it is scanned during the comparison process, because information advantage increases as does the duration and frequency of the amplifying affect. A coassembled set of amplified and transformed scenes amplified by affect, provides "magnification advantage" (Tomkins, 1992). Affect provides the initial abstract trigger and the other information, either concurrently or successively, brings into focus the area first magnified by the affect trigger. Thus, the concept of magnification advantage is the product of information advantage and affect density. The power of the cognitive information is now multiplied and magnified by the density of conscious affect. Consequently, if affect density and/or information advantage are low, magnification advantage is lower than if the power of both components were high.

It is important to note that the theoretical constructs pertaining to affective information are very abstract and difficult to understand in concrete, operational terms. However, the main point of his discourse is that affective and cognitive information require different means of processing because they are different types of information. When affect and cognition are combined, the cognitive information is no longer neutral, but is information that matters, in which knowing is transformed into minding and caring, such that the experience generates a "feeling" way of knowing (Tomkins, 1992).

The fact that affective and cognitive information are transformed differently because they contain different types of information, suggests that two partially independent memory systems exist (Zajonc, 1980), an affective system and a cognitive system. In fact, many believe that two systems do exist, and that the affective memory system uses different structures, neural pathways and neurotransmitters to process affective information prior to the processing of cognitive information (Ittelson, 1973; Izard, 1971, 1977; Zajonc, 1980, 1984).

Some researchers (e. g., Ekman, 1971; Tomkins, 1992) have identified primary emotions which would be processed by the affective memory system. Ekman (1971) identified six emotions believed to be universal, physiologically pure, elemental and primary. These emotions include: anger, happiness, fear, sadness, surprise and disgust. However, some have suggested that other emotions also should be included in this category (Izard, 1971, 1977; Plutchik, 1962; Watson, 1930). Nevertheless, they all agree that some form of anger and some form of happiness are two of the primary emotions processed by the affective memory system.

It is important to understand how the affective memory system develops and which emotions are processed therein because research shows that there are deficits in recognition memory for affect-laden information in dementia patients. Furthermore, some believe that the deterioration associated with dementia parallels in reverse that of development. Therefore, to try to understand affective memory system development in the context of its effect on the functioning of dementia patients, the focus will now turn to an exploration of

the theory of reverse pattern development, followed by dementia research and affective memory development in children.

Some believe that the mental deterioration associated with dementia parallels in reverse the pattern of childhood development (e. g., Reisberg, Ferris, de Leon, & Crook, 1982; Reisberg, in Roach, 1985; Sainsbury & Butler, 1991). In 1793, Benjamin Rush (in Roach, 1985) first reported infant-like behaviours in an 80-90 year old woman with dementia. Subsequently, researchers (e. g., Cole, in Roach, 1985) used Piaget's four-stage theory of cognitive development (see Piaget & Inhelder, 1969, for details) to study the performance of individuals with dementia. Although questions about reliability and validity arise when using tests devised for children, it was found that differential performance was function of levels of cognitive impairment. The least impaired could complete tasks indicative of the highest level of development (according to Piaget's stages), and the most impaired could only complete tasks indicative of the lowest level of development. This pattern of performance suggests that cognitive deterioration follows a reverse pattern of development (Cole, in Roach,

1985).

Reisberg (in Roach, 1985) also suggests that the pattern of deterioration parallels in reverse the pattern of development. The suggestion is not that the pattern of deterioration precisely mimics a reverse pattern of development (e. g., the last words spoken are not the first words learned), but is similar enough to allow inferences about specific processing abilities which are lost as the deterioration progresses. Over a period of several years, Reisberg, et al. (1982) observed hundreds of patients with Alzheimer's disease in a clinical setting. They concluded that as deterioration increased, patients progressively lost abilities in a pattern which appeared to be the opposite of learning. From this clinical data, they created a seven-stage scale based on a reverse order of physical and mental development, as a guide to determining which functions were lost at varying levels of impairment due to Alzheimer's disease. The scale was based on five areas: concentration, recent memory, past memory, orientation and self-care. Results gathered over a five year period were found to correlate significantly with 25 of 26 other behavioural

and neurological dementia assessment tools (Reisberg, et al., 1982).

Therefore, if deterioration occurs in a pattern similar to a reverse developmental pattern, information regarding recognition memory development and particularly how it pertains to affect, may provide insights as to how these processes are affected by dementia. Furthermore, if the affective memory system develops first (e. g., Izard, 1971; Zajonc, 1980, 1984) then perhaps it also deteriorates last. If so, dementia patients may still retain the ability to recognize affect-laden events (social interactions) containing primary emotions despite other, known deficits.

Deficits in recognition memory have been found in dementia patients with tasks using verbal (e. g., Grosse, Gilley, & Wilson, 1991) and nonverbal (e. g., Flicker, Ferris, Crook, & Bartus, 1987; Flicker, Ferris, Crook, & Bartus, 1990; Grosse, et al., 1991; Salmon, Granholm, McCullough, Butters, & Grant, 1989) materials. The majority of tasks require simple selection of old from new items via pointing or verbally responding. Therefore, either the deterioration is such that the information is no longer transformable during encoding

or the stimulus information is insufficient to facilitate adequate transformation during retrieval. In the nonverbal domain, deficits have also been observed in objects (e. g., Rohling, Ellis, & Scogin, 1991), words (e. g., Abbenhuis, Raajmakers, Raajmakers, & van Woerden, 1990; Diesfeldt, 1990; Taylor & McGuire, 1985), scenery (e. g., Butters, Albert, Sax, Miliotis, Nagode, & Sterste, 1983; Kopelman, 1985a, 1985b), figures (e. g., Grosse, et al., 1991) and unfamiliar, non-expressive faces (e. g., Ferris, Crook, Clark, McCarthy, & Rae, 1980; Flicker, et al., 1990; Hart, Smith, & Swash, 1985; Wilson, Kaszniak, Bacon, Fox, & Kelly, 1982), again because transformation affects both encoding and retrieval.

Some researchers have tried to increase stimulus information (and hence information advantage) by providing meaningful stimuli, such as famous faces from the 1920's to 1975 (Albert, Butters, & Levin, 1979; Wilson, Kaszniak, & Fox, 1981) or news pictures and famous tunes from the 1940's and 1980's (Corkin, Growden, Nissen, Huff, Freed, & Sagar, 1984). Across all tasks, dementia patients

performed poorer than normal elderly, perhaps because the tasks are still not affective ones, and, therefore, magnification advantage was too low to enhance recognition. Most likely, even though the stimuli may have contained some affective component, affect density was insufficient to facilitate recognition. However, it was not known which emotions were elicited. It is possible that the emotions generated by the stimuli were not primary and thus, were not part of the affective memory system.

Consequently, it is important to understand childhood development to determine which emotions are primary and thus, most likely to be well-known and have high affect density. Hence, the discussion will now briefly turn to developmental studies in order to clarify how recognition memory might decline during emerging aging deficits. Research indicates that children's performance on affect-laden tasks requiring recognition, discrimination and matching, improves with age (e. g., Bullock & Russell, 1984, 1985; Cunningham & Odom, 1986; Ireson & Shields, 1982; Russell & Bullock, 1985, 1986). Researchers have found that young children perform better on

affect-laden items than neutral items and that adding cognitive information to the neutral items does not facilitate recognition (e. g., Carson, Felleman, & Masters, 1983; Felleman, Barden, Carlson, Rosenberg, & Masters, 1983; Reichenbach & Masters, 1983). Some researchers suggest that this occurs because young children initially can only make egocentric responses to affect-laden items based on the feelings they experience when viewing test items because they have yet to develop the cognitive abilities necessary to process the neutral information (e. g., Brody & Carter, 1982; Glasberg & Aboud, 1982; Mood, Johnson, & Shantz, 1978). That is, children respond to repetition of experiences based on reactivation of the affect mechanism. Thus, the experience only activates an abstract feeling trace (Tomkins, 1992).

When comparing performance between emotions, researchers have shown that preschool children initially recognize happy best, followed by anger, then sadness (e. g., Bullock & Russell, 1984; Camras & Allison, 1985; Denham, 1986; Ireson & Shields, 1982;

Michalson & Lewis, 1985). Later on, preschool children are equally able to identify happy and anger emotions, which indicates that the ability to process information containing anger and happiness develops very early in childhood. By the age of five, children also become better able to process more complex affect-laden information, by matching primary emotions (happy, angry, sad) to given social situations (e. g., Borke & Su, 1972; Strayer, 1986), and by the age of seven they approach ceiling on neutral items (e. g., Reichenbach & Masters, 1983).

The fact that children progressively develop the ability to discriminate between different emotions suggests that structures for different emotions within the affective system may develop prior to others. Furthermore, not approaching ceiling on neutral items prior to age seven indicates that the cognitive system may continue to develop somewhat later. The ability to process more complex affect-laden information (social interactions) by age five indicates that children have enough repeated experiences with some social interactions evoking primary emotions that transformation of cognitive information and

amplification of affect density promotes recognition. If the pattern of deterioration is the reverse of development and the affective memory system develops first, then dementia patients may be able to perform well on facial recognition tasks involving primary emotions or more complex tasks which contain information that is sufficiently well-known to facilitate magnification advantage and subsequent retrieval.

Recently, researchers have included primary emotions in tasks assessing recognition memory deficits in dementia patients. In a study by Brosgole, Kurucz, PlaHovinsak, Sprotte, and Haveliwala (1983), participants were asked to point to the one picture out of a possible four (happy, angry, sad, neutral) depicting happiness, anger, or sadness, in four conditions: a) photographs of faces; b) caricature drawings of a man, woman, or child; c) caricature drawings of animals; and d) postural drawings of a man, woman or child. In the first three conditions, although error rates were low, dementia patients performed increasingly better on anger, sad, happy, items respectively. The same pattern of performance occurred in the fourth condition,

however, error rates were even lower when dementia patients were presented with postural stimuli. The superior performance on the affect-laden items relative to neutral items is similar to results found with children, which suggests that the affective memory system remains relatively intact in dementia patients. Furthermore, the facilitation effect of postural information suggests that combining well-known information from additional sources enhances cognitive information transformation and affect amplification, which in turn enhances magnification advantage and subsequent recognition.

In another study, Sainsbury and Coristine (1986) asked participants with Alzheimer's disease to select the picture they liked best from a matrix of four photographs containing one picture of a relative and three non-relatives. Although unable to name the relative in an earlier task, the relative's picture was preferred by the majority. Perhaps with Alzheimer's, the deterioration is such that the person cannot adequately identify the relative because s/he is unable to conjoin the general referent and specific referent, which would provide

information advantage, either because many of the general names and/or traces have deteriorated or the specific referent has deteriorated, or because the information provided at encoding and retrieval is consistent. Regardless, the cognitive requirement may be too great because the person must give a response that requires self-generation of information. Therefore, even with high affect density, information advantage is low, so the resulting magnification advantage is insufficient to produce retrieval of the address containing the relative's given name. Conversely, magnification advantage is low because of the inconsistency of its power at encoding and retrieval. However, when the participant is asked to provide a feeling response, which may depend more on higher affect density, s/he is able to do so because the product of the information and affect components are sufficiently powerful to provide adequate magnification advantage.

In a recent study conducted by Sainsbury and Butler (1991), pictures of faces depicting the six emotions determined by Ekman (Ekman, 1971; Ekman & Friesen, 1975) to be primary were shown with neutral pictures of faces. After a 45 minute delay, participants

were shown the affect-laden and neutral targets with an equal number and type of distractors, and asked to select old items from new items. Normative data were collected on over 400 individuals ranging in age from three to 62 years and on more than 70 individuals with Alzheimer's disease.

No significant differences in performance between neutral and affect-laden items were found across groups, except for within the youngest age group (three and four year olds) and the cognitively impaired group, both of whom recognized affect-laden targets significantly more than neutral targets. Furthermore, as cognitive impairment increased, performance on neutral targets decreased, whereas, performance on affect-laden targets remained relatively stable. The reverse pattern occurred with children. As age decreased, the ability to recognize neutral targets decreased, and performance on affect-laden items remained relatively stable. Thus, the more cognitively impaired the participants were, the more their responses were similar to the youngest children (Sainsbury, personal communication, July, 1993).

The stability of performance on affect-laden items by cognitively impaired participants, the decreased performance on neutral items by cognitively impaired participants with increasing deterioration and the similar results between the youngest children and the most impaired elderly, suggest that the affective memory system may develop first and follow a pattern of deterioration that is the reverse of development, and thus, is adversely affected last. Furthermore, significantly better performance on affect-laden items indicates that facial expressions contain high affect density. The actors expressing the emotions varied. Therefore, either affect density was sufficiently high to counteract the effects of low information advantage on magnification advantage, or the single previous viewing provided adequate information advantage and affect density to facilitate magnification advantage.

Collectively, the literature provides evidence that dementia patients perform significantly better on affect-laden items (e. g., Sainsbury & Butler, 1991) than on non-affect-laden items (e. g., Flicker, et al., 1990) on tasks involving the recognition of faces

expressing primary emotions. The literature also indicates that the stability of this ability and the affective memory system in which it first developed, is a function of being spared from the effects of deterioration until much later in the disease process because deterioration essentially follows a reverse pattern of development.

However, affect also plays an important role in social interactions (Zajonc, 1980) and research with children indicates that the ability to process more complex affect-laden information pertaining to social interactions develops at a young age (e. g., Borke, & Su, 1972). Therefore, if the pattern of deterioration is similar to the pattern of development, but in reverse, then dementia patients with varying degrees of impairment may also be able to perform well on tasks involving affect-laden social interactions despite a decreasing ability to recognize neutral items.

In addition, because ongoing experiences are organized over time into well-known categories to reduce the amount of new information to remember, a good test of retrieval memory would be one that is not so demanding as to require extensive new learning, but

would involve new relationships between well-known information (Tomkins, 1992). Therefore, a task combining well-known cognitive and affective information in the form of common, everyday conversations containing primary emotions, would have significant magnification advantage. Little new learning is required because both the cognitive and affective information is well-known as a function of repeated experiences with somewhat similar and somewhat different affect-laden conversation. Therefore, the combination of the highly amplified affective information would result in a powerful magnified feeling way of knowing. High magnification advantage coupled with consistency in stimuli at both encoding and retrieval (Tulving, 1981) would greatly enhance recognition performance.

Magnification advantage should be high for family members with whom one has had numerous affect-laden interactions. Yet, many family members report they are not recognized by dementia patients. Perhaps, asking for identification implies searching for the person's name. If so, the information provided at encoding and retrieval is inconsistent and the dementia patient may be forced to

self-generate memories associated with the person. This suggests that consistency in high magnification advantage is integral to both encoding and retrieval and will facilitate recognition memory in dementia patients despite known deficits.

Therefore, the purpose of this project was to test whether dementia patients could perform well on a more complex affect-laden recognition task involving social interactions and two of the primary emotions (anger, happy), for which processing abilities develop first (e. g., Carlson, et al., 1983; Izard, 1971) and subsequently deteriorate last. It was believed that these two emotions were more likely to be well-known as a function of ongoing experiences and therefore, to, have greater affect density (Tomkins, 1992). Moreover, the cognitive information had to be well-known, through ongoing past experiences, such that when the cognitive and affective information were combined, minimal new learning was required and new relationships could be created between "old" information. The less new learning required in a seemingly more complex task, the greater the information advantage and affect density, ergo, the greater the magnification

advantage and subsequent recognition performance (Tomkins, 1992).

Dementia patients within two levels of impairment were asked to discriminate old from new videotaped social interactions depicting affect-laden (anger, happy) or neutral conversations. Each conversation depicted common, everyday social interactions expressed in ordinary language by the same two female actors.

The experimental design was such that three groups of participants within two levels of impairment viewed 12 conversations in the learning phase; four each depicting anger, happiness, and neutrality. Forty-five minutes later, participants were asked to select the 12 previously seen conversations from 12 different conversations, four each depicting anger, happiness, or neutrality. Subgroups within the two levels were created to control for order and content effect. In each group, the order of conversation presentation varied as did the affect type used to express each conversation. For example, across subgroups the same conversation was presented in three different positions with a different affect type. In addition, if a particular conversation was chosen across subgroups, regardless of affect type,

it would indicate that something inherent to the conversation itself rather than the emotion determined selection.

Furthermore, across subgroups, the same conversation was always a target or distractor and all items were similar in that the same two actors appeared in all conversations, which provided consistency in verbal and nonverbal expressions at both learning and test phase. If different actors were used, the task would require the integration of additional cognitive information to identify the person associated with a specific conversation. This additional integration may place too much of a cognitive "load" on the task for this population. Consistency in faces and facial, vocal, and body movement patterns may reduce additional learning requirements and facilitate transformation and amplification. When a target and distractor are very similar not just to each other but to the information stored at encoding, the similar items refer to the same general memory trace, which provides more efficient access to their corresponding race than dissimilar items. Recognition is facilitated because one is able to disregard features common to compared items and concentrate on

distinctive features (Tulving, 1981).

Therefore, a 3 (subgroup) x 2 (level of impairment: low impairment, high impairment) x 2 (item type: target/distractor) x 3 (affect type: anger, happy, neutral) ANOVA with repeated measures on the latter two groups was conducted. It was hypothesized that there would be no main effects of Subgroup or Item type or any interaction effects between these variables and any other variables, which would indicate that there were no confounding effects due to order of presentation and that participants were not selecting a particular conversation regardless of affect type. The results would also indicate that participants were able to distinguish between similar targets and distractors.

It was expected that a main effect of Affect type would occur, indicating performance varied as a function of affect type expressed in each conversation. A main effect of Level of impairment also was expected, indicating that performance was effected by degree of cognitive impairment. However, it was also hypothesized that an interaction effect would occur between Affect type and Level of

impairment, wherein differences in performance between affect-laden and neutral items would increase as level of impairment increased. Specifically, the main effect of Affect type was expected to be limited to differences in performance on the neutral items. The main effect of Level of impairment was also expected to be limited to differences in performance on the High impairment group. Consequently, participants in both levels would perform essentially the same on affect-laden items and significantly poorer on neutral items, but the High impairment group would perform significantly poorer than the Low impairment group on neutral items.

These results would suggest that participants have had ample ongoing experiences with somewhat similar and somewhat different affect-laden conversations such that adequate transformation and amplification occurred to facilitate recognition. However, in the case of neutral items, transformation of cognitive information may be sufficient, but without the multiplicative power provided by amplifying affect, the product of transformation and amplification is inadequate to enhance recognition. Furthermore, the results would indicate that the

ability to process affect-laden conversations remains relatively stable although impairment increases.

It would be erroneous to suggest that particular conversations, worded with certain language and expressed with a particular type of emotion, are as well-known for an older person as they are for a younger person. Therefore, it was deemed necessary to have normal elderly adults rate the conversations to ensure the words and the context were appropriate for their age group. Over many years, an older person is more likely to have had many experiences with somewhat similar and somewhat different affect-laden conversations, which would significantly strengthen both information advantage and affect density, and thus, magnification advantage.

In addition, the use of test materials often requires the consideration of technical aspects which can confound test results. Thus, the videotapes were rated for technical precision and then the conversations were rated to determine whether they expressed the emotion (or non-emotion) they were intended to express, and whether the intensity of expression was consistent within each affect type.

Once this was completed, a small test group of dementia patients performed the task to ensure they could perform it, given its potential complexity and length and to illuminate any latent unforseen difficulties.

## Pilot Data

### Conversations

Conversations depicting everyday social interactions were created. The content of each conversation was carefully selected, such that all descriptive adjectives with affective attributions (e. g., wonderful) were avoided. The conversations were then rated to determine whether they were nondescript enough to make sense when spoken with anger, happiness, or no emotion, and whether the conversations were appropriate for an elderly population.

#### Method

Participants. Twelve individuals, six males and six females, ranging in age from 65-80 ($X = 72.9$) and ranging in education level from grade 8-12 ($X = 9.9$), verbally consented to participate. Participants' medical records and verbal nursing reports indicated no

mental deficiencies which would interfere with pilot data collection. All participants resided in a senior citizens lodge.

Materials. Twenty-four brief conversations of everyday events were created such that two interchanges occurred in each conversation. Topics for conversation and words used were specifically selected to allow for easy understanding familiarity to an aged population and affective neutrality (see Appendix A for conversations).

Procedure. After explaining the purpose of the project to participants, they were presented with a booklet containing the 24 written conversations and an instruction sheet (see Appendix B) requiring them to read each conversation separately and then circle the appropriate response (yes/no/unsure) on the response sheet to questions regarding whether the conversations were understandable, age-appropriate, and nondescript enough to make sense when spoken with anger, happiness or no emotion.

Results. Participants were in 100% agreement that the words and conversations were understandable and depicted events common

to their age group. When asked whether they had heard or had a similar conversation, for 23 of the 24 conversations, all participants stated that they had. Four of the twelve respondents knew what a beach was (conversation #5) and believed the conversation was plausible, but they personally had never been to a beach. All participants agreed that all conversations were plausible when spoken with anger. When asked whether the conversations were plausible when spoken with happiness, for 22 of the 24 conversations, participants were in 100% agreement that they were plausible. For the remaining two conversations, only two of the 12 respondents did not find conversation #10 plausible when spoken with happiness, and only one of the 12 respondents did not find conversation #21 plausible when spoken with happiness. When asked whether the conversations were plausible when spoken with no emotion, for 21 of the 24 conversations, participants were in 100% agreement that they were plausible. For the remaining three conversations (#5, #13, #22), one out of 12 respondents in each case did not think those conversations were plausible when spoken with no emotion. It is important to note

that participants were only able to read the conversations. Thus, they were unable to access additional affective or non-affective information to base their decisions upon. Nonetheless, agreement scores across questions ranged from 83.3% to 100%.

## Videotapes

The results of the conversation judgments indicated that the conversations were suitable to be transferred onto videotape. However, before any testing commenced, information on technical aspects of the videotapes was collected. Videotapes were used because nursing home residents are accustomed to watching television. Therefore, the task would provide an element of familiarity that may decrease potential anxiety caused by unfamiliarity of a test environment.

### Method

Participants. Ten individuals, six males and four females, ranging in age from 65-84 years ($X = 74.4$) and ranging in education level from grade 8-12 ($X = 10.2$), verbally consented to rate the videotapes. All participants resided in a senior citizens lodge.

Materials. Two females, aged 45 and 48, with prior amateur acting experience "acted out" all of the conversations. Each of the 24 conversations were spoken with anger, happiness, and no emotion for use across three subgroups. The actors practiced each conversation with each emotion/no emotion, over a 72 hour time period prior to taping. Minor word changes (e. g., changing of names) were made to some of the written conversations based on the actors' perceptions of comfortable language usage.

The videotapes displayed the head and shoulder movements of each actor. At least three retakes of each conversation, with each emotion/non-emotion were made to allow for technical oversights (e. g., actor's hand shown on screen) and to ensure that the best possible expressions of the emotions or non-emotion were captured. The experimenter and one independent judge (an expert videographer) ascertained the technical quality of each conversation as videotaping occurred.

The experimenter and one independent judge (an expert video editor) determined which out-take of each conversation best depicted

the emotion or non-emotion it was intended to depict. The video editor then spliced together each selected out-take, while ensuring that the duration of each complete conversation was approximately 16 seconds. An eight second interstimulus interval (ISI) of black screen was placed between each completed conversation. This was done to allow sufficient time for each conversation to "sink in," and reduce possible confusion between conversations which may occur with a shorter time interval and allow sufficient response time during the test phase. A one minute leader and a one minute trailer were also included on the finished videos. At the beginning of the leader, a brief segment announcing the tape and tape number was recorded to allow the experimenter to adjust the volume appropriately for each individual (if required) prior to viewing the first stimulus item.

Procedure. Participants were informed that they were going to view three videotapes of 24 brief conversations and that, although the conversations would be repeated, the affective state would vary. In one tape the conversation would depict anger, in another tape the same conversation would depict happiness, and in another tape the

same conversation would depict no emotion. Participants were also told that the television screen would go black for eight seconds between each conversation to allow those being tested to respond verbally (yes/no) when asked whether they had heard the conversation earlier. The experimenter explained that the purpose of the questions was to ascertain the technical quality of the videotapes. Participants were then given the list of questions (see Appendix C), asked to read them over, and pose any questions they had. Participants were then instructed to judge each conversation in each tape according to the questions provided.

Results. The data were collapsed across raters to obtain agreement scores for each stimulus item and each tape. For all conversations in all three tapes, participants were in 100% agreement that: a) the words and conversations were understandable, b) the conversations were not "phoney" or "fake'" c) the eight second ISI was the right amount of time to allow for responses, d) the emotions or non-emotions were clearly depicted, e) the words spoken were clearly distinguishable, and f) the contrast between actors and

background was sharp.

## Emotion Ratings

The purpose of the emotion rating scale was to determine whether there was consistency in the degree of emotion (anger, happy) depicted within each affect-laden category and between the anger and happy conversations. This was done to ensure that any differences in performance between affect-laden conversations could not be attributed to a difference in degree of emotion expressed. The purpose also was to determine whether the degree of neutrality depicted in each conversation was consistent and low to ensure that the neutral conversations were clearly non-affect-laden and therefore, highly distinguishable in affective content from the affect-laden conversations.

### Method

Participants. Twenty individuals, 10 males and 10 females, ranging in age from 63-89 years ($X = 74.1$) and ranging in education level from grade 7-12 ($X = 9.7$), verbally consented to participate. All participants resided in a senior citizens lodge.

Materials. A videotape containing the neutral depictions of the 24 conversations, followed by the anger and happy depictions, respectively, was created. The conversations depicting each emotion were presented sequentially to facilitate comparison within each affect type. An "Emotion Rating Scale" from 0-10 (0 = no emotion, 5 = moderate degree of emotion, 10 = very high degree of emotion) also was created. Others have used similar scales for large sample sizes to rate emotions. For example, a three-point scale indicating no emotion at all (1), emotion somewhat present (2), and emotion strongly represented (3) has been used for vocal tasks (e. g., Scherer, Banse, Wallbott, & Goldbeck, 1991).

Procedure. Once the purpose of the study had been explained, participants each received a booklet containing instructions and three sheets, numbered 1-24. Participants were informed that they would view three sets of the same 24 conversations, one set each depicting the same conversation expressed with anger, happiness and no emotion. After viewing each conversation, they were to circle the number from 0-10 on the "Emotion Rating Scale," which they believed

best corresponded to the degree of emotion or non-emotion expressed (see Appendix D for booklet). For the series of 24 neutral conversations, if the participant believed that the depiction was not neutral, they were instructed to document the emotion they believed was being expressed. The videotape depicting all 24 conversations with no emotional expression was shown first, followed by anger expressions, and then happy expressions.

Results. Data were collapsed across participants to determine means, modes, and ranges for each conversation and for each series of 24 conversation. For each neutral conversation, the individual scores ranged from 0-1 on the 10 point scale, the mean scores ranged from .00-.15, and the mode was 0. For the total series of neutral conversations, the means score was .03 and the mode was 0.

For each anger conversation, the individual scores ranged from 5-10 on the 10 point scale. However, mean scores ranged from 7.10-8.85, and the mode ranged from 7-9. For the total series of anger conversations, the mean score was 8.16 and the mode was 8.

For each happy conversation, the individual scores ranged from

5-10 on the 10 point scale. However, mean scores ranged from 7.0-9.1, and the mode ranged from 7-9. For the total series of happy conversations, the mean score was 7.93 and the mode was 8. These results clearly indicate that for this population, the degree of emotion expressed within each affective category (anger, happy, neutral) was relatively consistent as was the degree of emotion expressed between the two affect-laden categories (anger, happy). The results also indicate that the neutral conversations are highly discriminable from the affect-laden conversations. A randomized presentation design may have facilitated comparisons across affect type, whereas the block design facilitated comparisons within affect type. However, the expectation of no differences was strongly borne out, therefore, it is not believed that a random presentation would have netted significantly different information.

## Test Design

A similar design (Terletski, 1990) in which participants selected old from new videotaped depictions of affect-laden and neutral conversations indicated that performance by seven participants with

Alzheimer's disease was basically at floor level on neutral conversations. This may have been a function of the small sample size, or the level of cognitive impairment which was believed to be high, but was not experimentally assessed. Furthermore, to complete the task in this study, the attention of participants was required for approximately 12 minutes, which can be difficult for some dementia patients. Therefore, it was necessary to test a pilot group of dementia patients to determine whether they could do the task correctly, recognize enough of the neutral conversations to pull the mean results off the floor, and attend for the duration of the task.

Method

Participants. Guardian consent was verbally obtained (see Appendix E) for dementia patients, three females and two males, ranging in age from 69-79 years ($X = 76.2$) and ranging in education level from grade 8-12 ($X = 9.6$) to participate. Consent was then obtained from the participants (see Appendix F).

Materials. Although the words within each conversation were believed to be nondescript, certain nouns (e. g., flowers) ma contain

affective attributions. Therefore, three sets of the 24 conversations were created wherein the affect content (anger, happy, neutral) for each conversation varied across tapes. For example, the same conversation, number six, depicted happiness in tape number one, anger in tape number two, and no emotion in tape number three. The stimuli within each tape were ordered such that the first and last conversation in both the learning phase and the test phase was not the same conversation, or depicted the same affect-laden or neutral expression. There also were no more than three affect-laden conversations in a row, no more than two of which were anger or happy and at least one of which was a distractor in the test phase. There were no more than two sequential neutral conversations, one of which was a distractor in the test phase. Each half of the learning phase contained six of the target items, plus two anger, two happy and two neutral distractors. Also in the test phase, there were no more than three targets or two distractors sequentially. Within these boundaries, the conversations which depicted each emotion or non-emotion were randomized, as con be seen in Table 1. For the pilot

Table 1

Order of Presentation of Stimulus Items Across Subgroups

| Subgroup #1 | Subgroup #2 | Subgroup #3 |
|---|---|---|
| | Learning Phase | |
| # 6 Happy | # 4 Neutral | #14 Anger |
| #24 Anger | #14 Happy | #18 Neutral |
| #14 Neutral | # 6 Anger | #21 Happy |
| # 9 Neutral | #24 Neutral | #11 Anger |
| #22 Happy | # 9 Happy | #10 Neutral |
| #21 Anger | #10 Anger | # 8 Happy |
| #18 Happy | #11 Happy | # 9 Anger |
| #11 Neutral | # 8 Neutral | #22 Neutral |
| # 8 Anger | #18 Anger | # 4 Happy |
| #10 Happy | #23 Happy | #23 Anger |
| # 4 Anger | #21 Neutral | # 6 Neutral |
| #23 Neutral | #22 Anger | #24 Happy |

Table 1 (continued)

| Test Phase | | |
|---|---|---|
| #21 Anger* | #15 Happy | #22 Neutral* |
| #18 Happy* | #10 Anger* | #20 Neutral |
| #16 Neutral | #13 Happy | #24 Happy* |
| # 8 Anger* | # 7 Neutral | #19 Happy |
| #14 Neutral* | # 8 Neutral* | # 9 Anger* |
| #20 Happy | # 5 Anger | #17 Neutral |
| # 1 Anger | #23 Happy* | #12 Happy |
| #10 Happy* | #22 Anger* | # 2 Anger |
| #13 Neutral | # 1 Neutral | # 6 Neutral* |
| #11 Neutral* | # 9 Happy* | # 4 Happy* |
| #12 Anger | #21 Neutral* | #16 Anger |
| #17 Happy | # 3 Anger | #14 Anger* |
| #24 Anger* | #14 Happy* | # 3 Neutral |
| # 2 Neutral | #16 Happy | #11 Anger* |
| # 4 Anger* | #24 Neutral* | # 5 Neutral |
| # 3 Happy | #17 Anger | #21 Happy* |

Table 1 (continued)

| | | |
|---|---|---|
| # 9 Neutral | #11 Happy* | #13 Anger |
| #19 Anger | # 4 Neutral* | #18 Neutral* |
| # 5 Happy | #20 Anger | # 8 Happy* |
| # 6 Happy* | # 6 Anger* | #15 Anger |
| #23 Neutral* | #19 Neutral | # 7 Happy |
| # 7 Anger | #18 Anger* | #10 Neutral* |
| #15 Neutral | # 2 Happy | # 1 Happy |
| #22 Happy* | #12 Neutral | #23 Anger* |

* denotes target conversations.

data, the five participants viewed tape number one which was recorded on a Panasonic PV1227K 1/2 inch VHS video cassette recorder and shown on an Electrohome 12 inch colour television.

Procedure. Prior to testing, the experimenter interacted with each individual with the intent being to establish a trust relationship. Participants then underwent a brief cognitive assessment, the Mini Mental Status Examination (MMSE) (Folstein, Folstein, & McHugh, 1975). The following day, the experimenter again spent time with each participant prior to testing. Participants were informed they were going to view a videotape of two people talking briefly about different things common to everyday life. They also were informed that between each conversation, the television screen would go black for a short time. They were instructed to listen carefully to each conversation, because later on that same day, in about 45 minutes, the experimenter was going to show them more videotaped conversations and ask them if they had heard each conversation earlier that day.

Participants were individually shown the 12 target stimuli which

included four anger, four happy, and four neutral conversations. Stimuli were presented in random order, each conversation lasting about 16 seconds, with an eight second video timed interstimulus interval, wherein the screen went black. Following a 45 minute delay, in which they engaged in normal daily activities (e. g., exercise class), they were asked to select the 12 targets from 12 distractors by responding verbally whether they had heard the conversation earlier that day. The experimenter recorded the responses while seated in an unintrusive location, which allowed for observation of both the television and the participant.

Results. The MMSE scores ranged from 9-15 (out of a possible score of 30), with a mean score of 12.8. All participants were able to attend to the task. The mean number of correct responses for anger conversations was 7.0 (out of a possible 8). The mean number of correct responses for happy conversations was 7.0 (out of a possible 8). The mean number of correct responses for neutral conversations was 4.8 (out of a possible 8). These results suggest that experimental data would not net floor effects.

## Experimental Data

### Method

Participants. Thirty-six nursing home dwelling elderly, 23 females and 13 males, ranging in age from 69-93 (X = 81.9) and ranging in education from grade 6-12 (X = 9.7), with a primary diagnosis of some form of dementia participated. As shown in Table G-1, the range of types included Alzheimer's disease, organic brain syndrome, dementia, senile dementia, and senile dementia of the Alzheimer's type. Individuals with hearing or eyesight believed by staff and family members to be inadequate for testing purposes were excluded. Individuals who were taking medications with side effects that may interfere with testing (e. g., anti-anxiolytics) also were excluded. Once all preliminary inclusion/exclusion criteria were met (see Appendix H), the experimenter spoke with nursing staff and excluded potential participants who exhibited any transient characteristics (e. g., having sleep difficulties, having a "bad day" or week, were awaiting surgery, etc.) or any other behavioural or attention problems (restlessness, aggression, noncompliance, lability)

which may interfere with testing. The experimenter also inquired as to participant schedules (e. g., program participation, days usually out of the facility, specific routines, etc.) to facilitate test scheduling.

Guardian and participant consent was obtained by the same methods used for collecting pilot data. Normal elderly adults were not tested because results from a previous study (Terletski, 1990) using a similar design with videotaped conversations showed ceiling effects for normal participants. Therefore, testing normal elderly would not provide any new information.

Procedure. Prior to testing, the experimenter interacted with participants. Discussions included topics about personal activities, plans for the day, interests, family, etc., and lasted approximately 12 to 15 minutes, depending on how long it took to establish rapport with each individual. The goal of this procedure was to reduce anxiety for the participant, which may arise from encountering a stranger or engaging in unfamiliar activities and also to foster compliance and optimal performance. Once the experimenter believed that these criteria had been met, the MMSE was administered and scored over a

five day period.

Because of the stringent, stepwise inclusion/exclusion procedure that was used prior to testing, no participants were eliminated from the study due to unsuitable MMSE scores. Individuals with MMSE scores ranging from seven to 23 out of a possible 30 participated. Researchers have included individuals with scores ranging from seven to 24 (Grosse, et al., 1991) or 26 (Salmon, et al., 1989) out of a possible MMSE score of 30, and have still found performance deficits on recognition tasks in those with high scores and performance abilities in those with low scores. MMSE results were then used to assign participants to levels.

An equal number of participants for each level of impairment was possible when those scoring 14-23 were assigned to the Low impairment group (level 1) and those scoring seven to 13 were assigned to the High impairment group (level 2). As shown in Table I-1, participants were then matched as closely as possible within each level, on MMSE score, age, sex and education, and randomly assigned to one of three subgroups. Once levels and subgroups were

determined, the experimental task was administered over an eight day period and adhered to the same procedures as used for pilot data collection.

Results. "Remembering" was determined as the ability to correctly select old items and correctly reject new items. Therefore, participants received a score of 1 for responding "yes" to targets and "no" to distractors and a score of 0 for responding "no" to targets and "yes" to distractors. Six variables were created; "positive target," "negative target," "neutral target," "positive distractor," "negative distractor," "neutral distractor." The "positive" variables included conversations depicting happiness, the "negative" variables depicted anger and the "neutral" variables depicted no emotion.

Wilks multivariate test of significance indicated that the overall model was not significant, $F(18,76.85) = 1.28$, n. s., $p > .05$, and that it explained 50.9% of the total variance. Univariate analyses also indicated that there was non significant effect of any dependent variable on the independent variables. A multiple regression indicated no effect of age, $t(3) = -1.17$, n. s., sex, $t(3) = .07$, n. s., or education,

$t(3) = -.25$, n. s., on MMSE scores. Therefore, MMSE scores were not dependent upon these variables.

As can be seen in Table 2, the overall pattern of correlations indicate that the six variables cannot be combined into a single measure of performance. To be able to combine variables, one would expect the majority of correlations to be positive and significant. The results indicate that the majority of correlations are non-significant and several are negative. Therefore, a single measure of performance is not feasible.

The pattern of correlations also indicates that target and distractor items cannot be combined within each affect type (anger, happy, neutral). To be able to combine these variables, one would expect significant positive correlations among them. The results indicate that there is a positive, but non-significant correlation between negative targets and distractors, $r = .26$, n. s., and a negative, non-significant correlation between positive targets and distractors, $r = -.26$, n. s. However, there is a significant positive correlation between neutral targets and distractors, $r = .46$, $p < .05$,

Table 2

Correlations Among Variables

| | POST | POSD | NEGT | NEGD | NEUT | NEUD |
|---|---|---|---|---|---|---|
| POST | 1.00 | | | | | |
| POSD | -.26 | 1.00 | | | | |
| NEGT | .09 | .26 | 1.00 | | | |
| NEGD | -.18 | .05 | .26 | 1.00 | | |
| NEUT | .37* | -.26 | .27 | .22 | 1.00 | |
| NEUD | .45* | -.06 | -.04 | -.10 | .46* | 1.00 |

POST = positive targets, POSD = positive distractors, NEGT = negative targets, NEGD = negative distractors, NEUT = neutral targets, NEUD = neutral distractors.

* $p < .05$

Note: n = 36 participants.

which indicates these two items may be combined into a single item.

The correlation results indicate that overall, participants are not responding to items regardless of affect type or to a particular affect type. If the former were occurring, one would expect an overall pattern of significant positive correlations within each item type (targets/distractors) and significant negative correlations between each item type. The results indicate that although most correlations within each item type are positive, the only significant positive correlation exists between positive targets and neutral targets, $r = .37$, $p < .05$. If the latter were occurring, one would expect significant negative correlations within an affect type between item types.

The correlation results also indicate that there is not an overall pattern of significant negative correlations between item type. The results show that there are an equal number of positive and negative correlations among these items. The only significant correlation is positive and is between positive targets and neutral distractors, $r = .45$, $p < .05$.

In sum, the overall correlation results indicate that no pattern of

significant correlations exists among variables. Consequently, all six variables must be maintained for analysis purposes.

Therefore, a 3 (subgroup) x 2 (level of impairment) x 2 (item type) x 3 (affect type) ANOVA with repeated measures on the latter two was performed. There were no main effects of Subgroup, $F(2,30)$-3.09, n. s., $p>.05$, or Item type, $F(1,30)=4.0$, n. s., $p>.05$ (approaching significance). There also were no interaction effects of Subgroup or Item type with any other variables, which indicates there were no confounding effects due to order of presentation, participants were not selecting a particular conversation regardless of affect type, and, as predicted, participants were able to distinguish between similar targets and distractors.

As can be seen in Table 3, within each level of impairment, mean responses were similar on both affect-laden items and mean performance was better on affect-laden items than neutral items. Between levels of impairment, mean performance was similar on affect-laden items, but the Low impairment group performed better than the High impairment group on neutral items. Mean performances

Table 3

Mean Recognition Scores* on Variables by Level of Impairment

| | Low Impairment | | High Impairment | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| | | Targets | | |
| Positive | 3.55 | .51 | 3.33 | .49 |
| Negative | 3.50 | .62 | 3.39 | .50 |
| Neutral | 2.55 | .78 | 1.61 | .70 |
| | | Distractors | | |
| Positive | 3.39 | .50 | 3.22 | .73 |
| Negative | 3.33 | .49 | 3.11 | .47 |
| Neutral | 2.28 | .83 | 1.56 | .62 |

*mean score out of a possible 4.0.

are graphed in Figure 1, which illustrates the differences in affect-laden items, and shows that the Low impairment group performed better than the High impairment group on neutral items. Figure 1 also illustrates that the differences in performance within levels occurred between affect-laden and neutral items on both targets and distractors and that differences in performance between levels were attributable to neutral items for both targets and distractors. These results are consistent with the hypotheses that there would be no significant differences in performance between and within levels on affect-laden items (targets/distractors), that both levels would perform significantly poorer on neutral items than affect-laden conversations and that there would be a significant difference between levels in performance on neutral items.

As predicted, a main effect of Affect type was found, $F(2,60) = 105.47$, $p < .001$, indicating performance varied as a function of affect type. Dependent t-tests on targets showed no significant differences in performance between positive and negative targets, $t(35) = .00$, n.s., $SD = .72$, but did show significant differences in

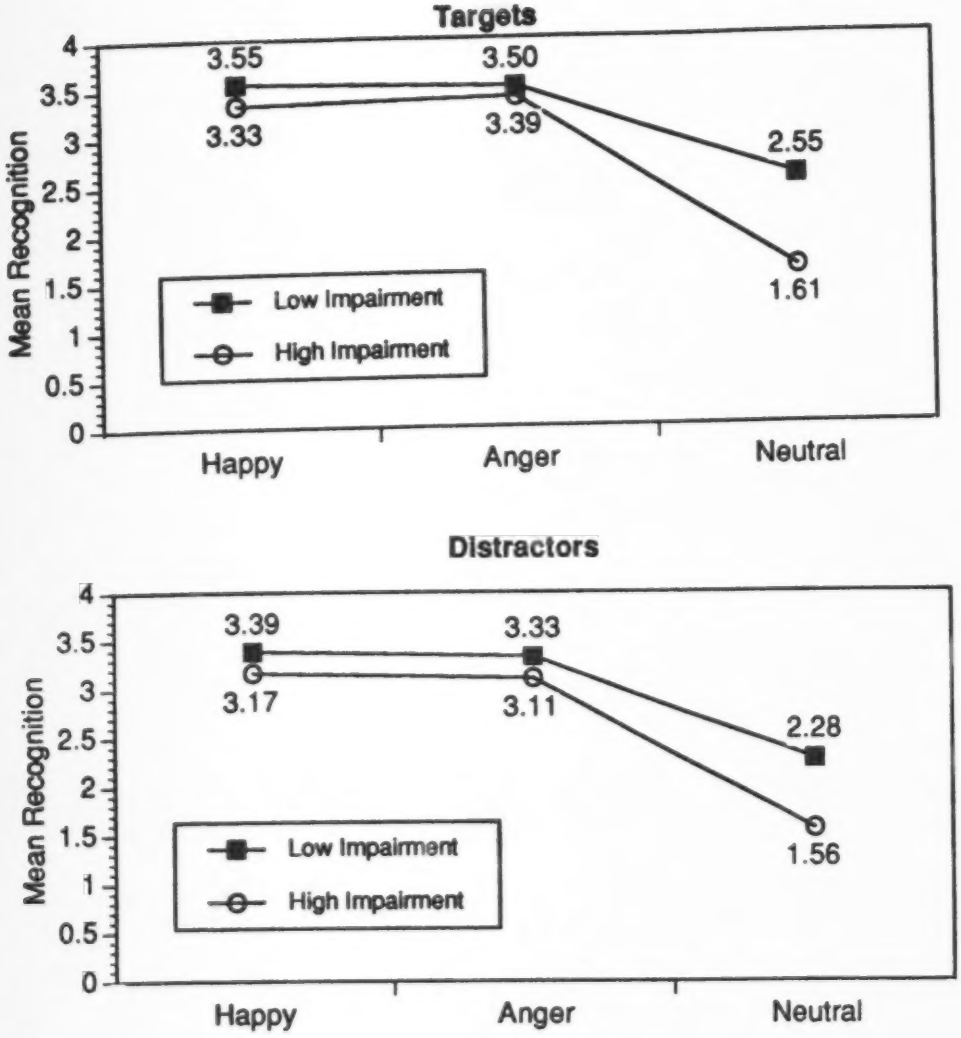


Figure 1. Mean recognition as a function of stimulus item type and affective content.

performance between positive and neutral targets, $t(35) = 9.8$, $p < .001$, $SD = .83$, and negative and neutral targets, $t(35) = 9.1$, $p < .001$, $SD = .89$. A test for homogeneity of variance indicated that the F value was not inflated due to heterogeneous variances for neutral items.

As predicted, a main effect of Level of impairment was found indicating there were significant differences in performance as a function of level of impairment. Dependent t-tests comparing performance between levels of impairment on each variable indicated there were no significant differences in performance between levels of impairment for affect-laden items (positive targets, $t(34) = -1.34$, n. s., negative targets, $t(34) = -.59$, n. s., positive distractors, $t(34) = -.80$, n. s., negative distractors, $t(34) = -1.39$, n. s. There were significant differences in performance between levels of impairment for neutral items (neutral targets, $t(34) = -3.82$, $p < .01$, and neutral distractors, $t(34) = -2.97$, $p < .05$.

As predicted, a significant Level of impairment x Affect type interaction was found, $F(2,60) = 6.13$, $p < .01$, indicating the

differences in performance between affect-laden and neutral items increased as level of impairment increased. Dependent t-tests showed no significant differences across levels of impairment between positive and negative targets, $t(10) = -.29$, n. s., $x = -.06$, $SD = .81$ (low impairment), $t(17) = .37$, n. s., $x = -.06$, $SD = .64$ (high impairment). Significant differences were found across levels of impairment between positive and neutral targets, $t(17) = -5.05$, $p < .01$, $x = -1.0$, $SD = .84$ (low impairment), $t(17) = 10.92$, $p < .01$, $x = 1.72$, $SD = .67$ (high impairment) and between negative and neutral targets, $t(17) = 4.99$, $p < .01$, $x = .94$, $SD = .80$ (low impairment), $t(17) = 9.33$, $p < .01$, $x = 1.78$, $SD = .81$ (high impairment). Therefore, the main effect of Affect type was limited to differences in performance on neutral items and the main effect of Level of impairment was limited to differences in performance in the High impairment group. Thus, as predicted, increased impairment had no significant adverse effect on performance for affect-laden items. Furthermore, as predicted, both groups performed significantly better on affect-laden items than neutral items but the High impairment group performed significantly

poorer than the Low impairment group on neutral items.

## Discussion

The results of the ANOVA clearly support the hypotheses, in that, there were no significant differences in performance within and between levels of dementia patients on affect-laden items and both levels of impaired participants recognized affect-laden conversations significantly more often than they recognized neutral conversations. Consistent with Tomkins (1992), this high level of performance may indicate the collection of somewhat similar and somewhat different conversational experiences over time decreased the amount of new learning required and increased information advantage and affect density.

Affect density was believed to be high because one would most likely have a great many experiences with these primary emotions over a great length of time. Furthermore, high affect density may explain why dementia patients were good at recognizing affect-laden pictures of faces (e. g., Sainsbury & Butler, 1991) when unable to recognize pictures of faces without the affective component (e. g., Flicker, et al.,

1990).

Information advantage also was believed to be high because research indicates that the ability to process information pertaining to social interactions develops early in life (e. g., Borke & Su, 1972). Therefore, one would likely have a great many experiences with somewhat similar and somewhat different conversations over a lengthy life span, which would facilitate transformation. However, without the multiplicative advantage afforded by affect density, information advantage was insufficient on its own and dementia patients were less able to recognize the neutral conversations. As the deterioration of the cognitive system progressed, the ability to access the relevant cognitive information decreased. Alternatively, it is possible that poor performance on neutral items was due to low information advantage as a result of cognitive deterioration or minimal experiences with the social interactions presented and that this deficit was counteracted by exceedingly high affect density. Regardless, the results support Tomkins (1992) view that the conjoint information pertaining to affect-laden conversations had high magnification

advantage because they were amplified and transformed into a feeling way of knowing.

The reason magnification advantage facilitates performance on this task and not others, such as identifying family members by name, is because the search to retrieve the person's name requires the self-generation of information relevant to the person, whereas in this task, information at encoding and retrieval is consistent. Therefore, a unique trace is established at encoding (Tulving, 1981) and the miniature analogue of the information can be expanded (Tomkins, 1992) to facilitate search and comparison at retrieval (Mandler, 1980 for an exact match to the stored information.

The foregoing conclusions are based on the assumption that two memory systems exist which must in some way communicate with one another for individuals to be able to recognize affect-laden items. If two systems exist, then the affective and cognitive information is processed independently and integrated at input or output. However, with cognitive deterioration, participants may not be able to interrelate (e. g., Tversky, 1973) the cognitive information

relevant to each affect-laden conversation, either at input or output, which would result in more errors on affect-laden items. The robust results indicate that participants have not lost the ability to integrate the affective and cognitive information relevant to this task.

It is possible that only one system exists, a cognitive system, wherein all affective information also is contained (e. g., Tomkins, 1992). Thus, integrated cognitive and affective information would be a function of a higher-order "minding system" (Tomkins, 1992) within the cognitive system. If so, then poor performance on neutral items would indicate that cognitive system deterioration is random and/or the affective information relevant to at least primary emotions is more impervious to destruction, unless the higher-order minding system is spared from deterioration. However, when and where this higher-order system develops or would be located to be spared has not been clarified.

Perhaps another, somewhat separate system does exist, wherein magnified information is contained. That is, at input, both the affect name and the cognitive name are processed conjointly to

produce a new name that refers to the amplified, transformed information. Before the age of six months, a child's response to repeated experiences is a reactivation of an affective response, because the child has no cognitive memory abilities yet (Tomkins, 1992). Therefore, prior to development of the cognitive system, the child only has amplification abilities which must be used to process incoming cognitive information. Thus, initially, rudimentary cognitive information would be amplified. Over time, with repeated experiences, the information would be amplified and transformed. As one continued to develop, the child would be able to amplify and transform more complex information and eventually use the transformation shills within the system to develop the cognitive system.

Thus, the "transitional system" would have the multiplicative powers of transformation and amplification as a function of repeated experiences with somewhat similar and somewhat different affect-laden events. As deterioration increases, then the transitional system may begin to deteriorate, which may explain why performance by the High impairment group on affect-laden items is slightly less than that

of the Low impairment group. Furthermore, poor performance on neutral items would indicate they are processed in the cognitive system, and not a transitional or minding system (Tomkins, 1992), thus, they lack amplification. Moreover, they may not be accessible due to the extent of the deterioration within the cognitive system. therefore, dementia patients should be able to access affect-laden information within the transitional system as long as it remains relatively intact and as long as the product of information advantage and affect density are high enough at encoding and retrieval to produce sufficient magnification advantage.

However, this study is merely a first step, in that it only shows dementia patients can recognize well-known affect-laden conversations containing primary emotions. Given the high performance rates on affect-laden items, it is possible that there were ceiling effects. If so, it is possible that there would be differences between the two groups if ceiling effects for these items were not present. Therefore, future research needs to explore whether the results of this project were primarily a function of exceedingly high

affect density attendant to the emotions used, or whether the results were due to magnification advantage which comes from the combination of cognitive transformation and affective amplification , or whether ceiling effects negate the results.

One possible means of determining the power of magnification, would be to have all items affect-laden (primary emotions) and to vary the degree of information advantage. A method of assessing the power of affect density, would be to increase the cognitive "load." However, if this format were used, one would do well to not ignore the effects of information advantage when determining what that load will be. If magnified information exists in a transitional system, then perhaps the information relevant to emotions believed to be determined by cognitive information (e. g., culture), such as, guilt and shame (e. g., Lazarus, 1991), also are contained therein by the simple fact that if the emotion is determined by the cognitive information, then the two must in some way be interrelated or magnified as well. Therefore, another step would be to compare performance on items

containing primary and non-primary emotions, which would provide insights into the power of affect density and may also provide evidence in support of a transitional system.

References

Abbenhuis, M. A., Raaijmakers, W. G. M., Raaijmakers, J. G. W., & van Woerden, G. J. M. (1990). Episodic memory in dementia of the Alzheimer type and in normal ageing: Similar impairment in automatic processing. Quarterly Journal of Experimental Psychology, 42A, 569-583.

Albert, M. S., Butters, N., & Levin, J. (1979). Memory for remote events in chronic alcoholics and Korsakoff patients. In H. Begleiter and B. Kissen (Eds.), Alcohol intoxication and withdrawal. New York: Plenum Press.

Borke, H., & Su, S. (1972). Perception of emotional responses to social interactions by Chinese and American children. Journal of Cross-Cultural Psychology, 3, 309-314.

Brody, L., & Carter, A. (1982). Children's emotional attributions to self versus other: An exploration of an assumption underlying projective techniques. Journal of Consulting and Clinical Psychology, 50, 665-671.

Brosgole, L., Kurucz, J., PlaHovinsak, T. J., Sprotte, C., & Haveliwala,

Y. A. (1983). Facial-and postural-affect recognition in senile elderly persons. International Journal of Neuroscience, 22, 37-46.

Bullock, M., & Russell, J. (1984). Preschool children's interpretation of facial expressions of emotion. International Journal of Behavioral Development, 7, 193-214.

Bullock, M., & Russell, J. (1985). Further evidence on preschooler's interpretation of facial expressions. International Journal of Behavioral Development, 8, 15-38.

Butters, N., Albert, M. S., Sax, D. S., Miliotis, P., Nagode, J., & Sterste, A. (1983). The effect of verbal mediators on the pictorial memory of brain damaged patients. Neuropsychologia, 21, 307-323.

Camras, L., & Allison, K. (1985). Children's understanding of emotional facial expressions and verbal labels. Journal of Nonverbal Behavior, 9, 84-94.

Carlson, C., Felleman, E., & Masters, J. (1983). Influence of children's emotional states on the recognition of emotion in peers and social motives to change another's emotional state. Motivation

and Emotion, 7, 61-79.

Corkin, S., Growden, J. H., Nissen, M. H., Huff, F. J., Freed, D. M., & Sagar, H. J. (1984). Alzheimer's disease: Advances in basic research and therapies. In R. J. Wurtman, S. Corkin, & J. H. Growden (Eds.). Proceedings of the Third Meeting of the International Study Group on the Treatment of Memory Disorders Associated with Ageing, (pp. 75-94).

Cunningham, J., & Odom, R. (1986). Differential salience of facial features in children's perception of affective expression. Child Development, 57, 136-142.

Denham, S. (1986). Social cognition, prosocial behavior, and emotion in preschooler's: Contextual validation. Child Development, 57, 194-201.

Diesfeldt, H. F. A. (1990). Recognition memory for words and faces in primary degenerative dementia of the Alzheimer type and normal old age. Journal of Clinical and Experimental Neuropsychology, 12, 931-945.

Ekman, P. (1971). Universals and cultural differences in facial

expressions of emotion. In J. K. Cole (Ed.) (1972), Nebraska Symposium of motivation, 1971 (pp. 207-283). Lincoln: University of Nebraska Press.

Ekman, P., & Friesen, W. V. (1975). Unmasking the face: A guide to recognizing emotions from facial clues. Englewood Cliffs, NJ: Prentice-Hall.

Felleman, E., Barden, R., Carlson, C., Rosenberg, L., & Masters, J. (1983). Children's and adults' recognition of spontaneous and posed emotional expressions in young children. Developmental Psychology, 19, 405-413.

Ferris, S. H., Crook, T., Clark, E., McCarthy, M., & Rae, D. (1980). Facial recognition memory deficits in normal aging and senile dementia. Journal of Gerontology, 35, 707-714.

Flicker, C., Ferris, H., Crook, T., & Bartus, R. T. (1987). A visual recognition memory test for the assessment of cognitive function in aging and dementia. Experimental Aging Research, 13, 127-132.

Flicker, C., Ferris, H., Crook,. T., & Bartus, R. T. (1990). Impaired facial recognition memory in aging and dementia. Alzheimer

Disease and Associated Disorders, 4(1), 43-54.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). "Mini-Mental State": A Practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research, 12, 189-198.

Glasberg, R., & Aboud, F. (1982). Keeping one's distance from sadness: Children's self-reports of emotional experience. Developmental Psychology, 18, 287-293.

Glass, A. L., & Holyoak, K. J. (1986). Cognition. New York: Random House.

Graf, P., & Mandler, G. (1984). Activation makes words more accessible, but not necessarily more retrievable. Journal of Verbal Learning and Verbal Behavior, 23, 553-568.

Grosse, D. A., Gilley, D. W., & Wilson, R. S. (1991). Episodic and semantic memory in early versus late onset Alzheimer's disease. Brain and Language, 41, 531-537.

Hart, S. A., Smith, C. M., & Swash, M. (1985). Recognition memory in Alzheimer's disease. Neurobiology of Aging, 6, 287-292.

Ireson, J., & Shields, M. (1982). The development of the young

child's representation of emotion. London, England: University of London Institute of Education.

Ittelson, W. H. (1973). Environment perception and contemporary perceptual theory. In W. H. Ittelson (Ed.), Environment and cognition. New York: Seminar Press.

Izard, C. E. (1971). The face of emotion. New York: Appleton-Century-Crofts.

Izard, C. E. (1977). Human emotions. New York: Plenum Press.

Izard, C. E. (1984). Emotion-cognition relationships and human development. In C. E. Izard, J. Kagan, & R. B. Zajonc (Eds.), Emotions, cognition, and behavior (pp. 17-37). New York: Cambridge University Press.

Izard, C. E. (1993). Four systems for emotion activation: Cognitive and noncognitive processes. Psychological Review, 100, 68-90.

Jacoby, L. L. (1991). A process dissociation framework: Separating automatic from intentional uses of memory. Journal of Memory and Language, 30, 513-541.

Jacoby, L. L., Lindsay, D. S., & Toth, J. P. (1992). Unconscious influences revealed: Attention, awareness, and control. American Psychologist, 47, 802-809.

Kopelman, M. D. (1985a). Rates of forgetting in Alzheimer-type dementia and Korsakoff's disease. Neuropsychologia, 23, 623-628.

Kopelman, M. D. (1985b). Multiple memory deficits in Alzheimer-type dementia: Implications for pharmacotherapy. Psychological Medicine, 15, 527-541.

Lazarus, R. S. (1991). Emotion and Adaptation. Oxford: Oxford University Press.

Mandler, G. (1980). Recognizing: The judgment of previous occurrence. Psychological Review, 87, 252-271.

Mandler, G. (1984). Mind and body: Psychology of emotion and stress. New York: Norton.

Michalson, L., & Lewis, M. (1985). What do children know about emotions and when do they know it? In M. Lewis & C. Saarni (Eds.), The socialization of emotions (pp. 117-139). New York: Plenum Press.

Mood, D., Johnson, J., & Shantz, C. (1978). Social comprehension and affect-matching in young children. Merrill-Palmer Quarterly, 24, 63-66.

Morris, R. G., & Kopelman, M. D. (1986). The memory deficits in Alzheimer-type dementia: a review. Quarterly Journal of Experimental Psychology, 38A, 575-602.

Piaget, J., & Inhelder, B. (1969). The psychology of the child. New York: Basic Books.

Plutchik, R. (1962). The emotions: Facts, theories, and a new model. New York: Random House.

Reichenbach, L., & Masters, J. (1983). Children's use of expressive and contextual cues in judgments of emotion. Child Development, 54, 993-1004.

Reisberg, B., Ferris, S. H., de Leon, M. J., & Crook, T. (1982). The global deterioration scale for assessment of primary degenerative dementia. American Journal of Psychiatry, 139, 1136-1139.

Roach, M. (1985). Reflection in a fatal mirror. Discover, 6(8), 76-85.

Rohling, M. L., Ellis, N. R., & Scogin, F. (1991). Automatic and

effortful memory processes in elderly persons with organic brain pathology. Journal of Gerontology: Psychological Sciences, 46, 137-143.

Russell, J., & Bullock, M. (1985). Multidimensional scaling of emotional facial expressions: Similarity from preschoolers to adults. Journal of Personality and Social Psychology, 48, 1290-1298.

Russell, J., & Bullock, M. (1986). On the dimensions preschoolers use to interpret facial expressions of emotion. Developmental Psychology, 22, 97-102.

Sainsbury, R. S., & Butler, K. (1991, February). The development of a test for the recognition of facial expression. Paper presented at the annual meeting of the International Neuropsychological Society, San Antonio, TX.

Salmon, D. P., Granholm, E., McCullough, D., Butters, N., & Grant, I. (1989). Recognition memory span in mildly and moderately demented patients with Alzheimer's disease. Journal of Clinical and Experimental Neuropsychology. 11, 429-443.

Scherer, K. R., Banse, R., Wallbott, H. G., & Goldbeck, T. (1991).

Vocal cues in emotion encoding and decoding. Motivation and Emotion, 15, 123-148.

Strayer, J. (1986). Children's attributions regarding the situational determinants of emotion in self and others. Developmental Psychology, 22, 649-654.

Taylor, R. & McGuire, R. J. (1985). Response competition in three amnesic groups. British Journal of Clinical Psychology, 24, 145-147.

Terletski, B. G. (1990). Affective Memory in the Alzheimer's Patient. Unpublished honor's thesis, University of Alberta, Edmonton, Alberta.

Tomkins, S. S. (1992). Affect, imagery, consciousness: Cognition Duplication and transformation of information, Vol. 4). New York: Springer Pub.

Tulving, E. (1979). Relation between encoding specificity and levels of processing. In L. S. Cermak & F. I. M. Craik (Eds.), Levels of processing and human memory. Hillsdale, NJ: Erlbaum.

Tulving, E. (1981). Similarity relations in recognition. Journal of

Verbal Learning and Verbal Behavior, 20, 479-496.

Tversky, B. (1973). Encoding processes in recognition and recall. Cogni e Psychology, 5, 275-287.

Watson, J. B. (1930). Behaviorism. Chicago: University of Chicago Press.

Wechsler, D. (Ed.). (1987). Wechsler memory scale-Revised. San Antonio, TX: Harcourt, Brace, Jovanovich.

Wilson, R. S., Kaszniak, A. W., Bacon, L. D., Fox, J. H., & Kelly, M. P. (1982). Facial recognition memory in dementia. Cortex, 18, 329-336.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. American Psychologist, 35, 151-175.

Zajonc, R. B. (1984). On the primacy of affect. American Psychologist, 39, 117-123.

Appendix A

Affective Memory Study: Conversations

1. A. My brother-in-law bought me flowers for my birthday last weekend.

   B. Oh really.

   A. Yes. A bouquet of roses, daisies, and gardenias in a green vase.

   B. I'd never have expected that from him.

2. A. Did you see the short skirts that those girls were wearing?

   B. Do you mean the black and white velvet ones?

   A. Yes. They'll probably get arthritis or something.

   B. You're right. They'll pay for it one of these days.

3. A. When we were kids, we would never have gotten away with putting chewing gum under a table.

   B. I've even seen them drop it on the ground and then put it back in their mouths.

   A. The other day at the mall, I saw one kid pick up someone else's gum and put it in his mouth.

Appendix A (continued)

B. Really?

4. A. I talked to Jack the other day about him watching sports shows on tv all the time.

   B. Yes. I talked to Tom about it too, just last night.

   A. I don't think it will really make a difference.

   B. Neither do I.

5. A. I got a postcard from my niece today.

   B. What did she have to say?

   A. Not too much. She mostly talked about what it was like to live on the beach.

   B. I wouldn't mind living on the beach.

6. A. When I opened my door last night-there stood a policeman.

   B. What did he want?

   A. I'm not really sure. He just asked who I was and if I could prove that I was the one who really lived there and then he left.

   B. Isn't that odd?

Appendix A (continued)

7. A. My cat Tiger was in the big plant again this morning.

   B. He's always in that plant.

   A. Yes, but today he knocked it over and got dirt all over the floor and himself.

   B. Well, maybe he'll know better next time.

8. A. I was about to park my car at the mini-mart when someone came in from the other direction and took my spot.

   B. You know the same thing happened to me a while ago. So I got smart and did it to someone else.

   A. Was it worth it?

   B. Yes.

9. A. My little grandson Jimmy was at the dentist's for the first time last week.

   B. How was his visit?

   A. I guess he screamed and hollered so much that the dentist couldn't even look in his mouth.

   B. That sounds like Jimmy.

Appendix A (continued)

10. A. You should've been here for supper last night.

    B. Why? What happened?

    A. I made one of my special cherry pies and while I was carrying it to the table, it slipped out of my hands and fell face down on the kitchen floor.

    B. Oh dear.

11. A. I was crossing the street during the noon hour rush and tripped over some garbage someone had left at the intersection.

    B. Did you hurt yourself?

    A. No, but a lot of people were staring at me.

    B. It figures.

12. A. I managed to catch the big sale at the department store.

    B. What did you buy?

    A. I bought 10 pairs of underwear, but I was in such a hurry that it wasn't til I got home that I realized they were all larger than I needed.

Appendix A (continued)

B. At least you can take them back.

13. A. Did you see what I saw at the group picnic?

B. Do you mean the dog?

A. Yes. That boy threw his frisbee right over the picnic table and his dog chased right across it and spilled everything.

B. I know.

14. A. Alice and Bob won the biggest jackpot we've ever had at bingo Thursday.

B. So I heard.

A. Bob said that they were going to buy themselves a new motorhome with the money.

B. That really was a big jackpot.

15. A. Do you remember that wool sweater you made me last year?

B. Yes. What of it?

A. Jack washed it with the laundry last Saturday and it shrunk so much that it will only fit my little granddaughter now.

B. I guess Jack won't be doing laundry anymore.

Appendix A (continued)

16. A. We went out for dinner with the Butler's last night.

    B. And?

    A. And Tom spilt tomato sauce all down the front of his white shirt. He sat there and watched the meatball roll down his lap and onto the floor.

    B. That's not unusual for Tom.

17. A. You should've been in your backyard yesterday.

    B. Why?

    A. I had just gotten dressed for dinner and thought I'd move the water sprinkler. While I was moving it at the back, Jack came home and turned it on in the front. I got soaked from head to toe.

    B. Dear me.

18. A. Did you hear what happened to me at Julie's wedding?

    B. No, what?

    A. Well, I was talking to the groom's parents and my false teeth fell out. But I managed to catch them and quickly put them

Appendix A (continued)

back in before anyone else noticed.

B. You always get yourself in these situations.

19. A. Do you remember when we got on the bus that one time and didn't have the exact change.

B. Vaguely.

A. You know. The bus driver kicked us off because he wasn't sure if he could trust us to pay him next time.

B. Now I remember.

20. A. I was late for Danny's graduation ceremony today.

B. How did that happen?

A. I slept through my alarm again this morning, that's how.

B. I think you'd better get an alarm clock with a louder bell.

21. A. Why didn't you know what to do?

B. Because I've never changed a flat tire before and certainly not on a hill in a busy area.

A. I thought you had.

B. No I haven't. But then neither have you.

Appendix A (continued)

22. A. I was at the park yesterday.

B. How was it?

A. Well, I sat on what I thought was a new park bench. Turns out it was just freshly painted. I have green paint on the back of my dress.

B. Way to go Helen.

23. A. I went to that new grocery store down the street.

B. What did you think of it?

A. I may not go back. I was taking an orange from the bin and the entire stack fell down and oranges were rolling every which way across the floor.

B. At least they'll remember you.

24. A. I deposited your cheque for you at the bank.

B. Did you have any problems with it?

A. Just that the teller kept calling me by your name and trying to get me to invest in some bonds they were selling?

B. Did you buy any?

Appendix B

Conversation Ratings

Thank you for taking the time to participate in this exercise. It should not require any more than 20-30 minutes of your time. Your cooperation will assist in research pertaining to cognitively impaired elderly. This information will be handled with the utmost confidentiality. THIS IS NOT A TEST. There are no right or wrong answers. The information collected will be used to determine the validity of test items to be used in later research. Thank you.

B. Gwenn Terletski

University of Alberta

INSTRUCTIONS

Enclosed you will find a series of 24 brief conversations. Please read each conversation separately and then answer the questions listed below by circling the appopriate response on the "Conversation Rating Response Sheet" attached to the back. Also, please provide your age, sex (male, female) and education level as denoted below.

Appendix B (continued)

Question #1: Are the words and conversations understandable?

Question #2: Do you think that, in general, this conversation depicts events that are common for your age group?

Question #3: Have you had, or heard, a similar conversation at some time?

Question #4: Do you think this conversation makes sense when spoken with anger?

Question #5: Do you think this conversation makes sense when spoken with happiness?

Question #6: Do you think this conversation makes sense when spoken with no emotion at all?

Age: _____ Sex: _____ Education: _____

## Appendix C

### Questions Pertaining to the Videotapes

1. Are the words and conversations understandable? If not, list which one and explain why (extra paper provided).
2. Do any of these conversations seem phoney or fake?
3. Is the 8 second time delay between each conversation too long, too short, or just right for viewing and to respond?
4. Do the videotaped conversations clearly depict the emotions.
5. Can you clearly distinguish the voices of the actors and what they are saying?
6. Can you clearly distinguish the actors heads and shoulders from the background?
7. Additional comments?

Appendix D

Rating Degree of Emotionality

Instructions:

Three sets of 24 conversations will be presented. One set will contain conversations in which the actors are expressing no emotion. One set will contain conversations in which the actors are expressing anger. Once set will contain conversations in which the actors are expressing happiness. For the set of 24 conversations depicting no emotion, please circle the number on the "Emotion Rating Scale" that best corresponds to the degree of neutrality. However, if you think that the conversation does show some emotion, please write the emotion you think the actors are portraying in the blank space provided. For each of the conversation s depicting anger or happiness, please circle the number on the "Emotion Rating Scale" that best corresponds to the degree of emotion depicted. Also, pleas provide your age, sex (male, female) and education level on response sheet.

This is not a test. Correct answers are determined by your evaluation of the degree of emotion depicted.

Appendix D (continued)

Example:

0 = no emotion depicted

5 = moderate degree of emotion depicted

10 = very strong degree of emotion depicted

Anger Expression

0 1 2 3 4 5 6 7 8 9 10

no emotion moderate strong

Appendix E

Guardian Consent Form

Dear

I am a researcher in the Psychology Department at the University of Alberta. I am currently looking for volunteers to assist me on a project that is designed to understand emotions and whether individuals with varying cognitive abilities can remember events better when they contain an emotional component. This project has been specifically designed to ensure that participants find it quick and easy.

To be able to conduct this research, participants need first undergo a simple, brief test, which assesses cognitive abilities (copy of test available for perusal). One this assessment has been completed, the experimental phase of the study will commence. The task consists of a videotape showing two people interacting in normal day-to-day conversations (cite example). There are two parts to the presentation. First, the participant will be asked to view a videotape showing twelve different conversations, some with emotional content, some without. This should require no more than 15 minutes

Appendix E (continued)

of his/her time. After a 45 minute delay, in which the participant can engage in normal daily activities, he/she will view a videotape of 24 conversations, and will be asked to select the 12 viewed earlier, by simply responding "yes" or "no." This should require no more than about 15-20 minutes.

No names will be used on the data sheets, only a special code. All information will be strictly confidential and confined to research personnel. Only group data will be presented. There is no obligation to participate and refusal will not jeopardize care or treatment of the participant or yourself. If you consent and later wish to withdraw, or the participant wishes to withdraw, this may be done without ramifications and all data collected to that point will be destroyed. Also, although nothing about the test procedure is stressful or anxiety-causing, the participant will be monitored for anxiety/stress that may be caused by anything external to the test environment (e. g., the participant had a bad night). The researcher will cease testing at any point where such is apparent. Participant consent also will be

Appendix E (continued)

solicited. Thank you.

Sincerely,

B. Gwenn Terletski

---

Name of Resident (please print): _____

Name of Guardian (please print): _____

Signature of Guardian: _____

Date: _____

Appendix F

Participant Consent Form

Dear

I am a researcher in the Psychology Department at the University of Alberta. I am currently working on a project that is designed to understand emotions and how people recognize them in others and I am looking for volunteers to assist me. It is very easy to do and does not take much time.

First, I will ask you to do a simple little test for me that will involve things like drawing a picture, counting and naming certain objects. Then, later on, I will show you a videotape of 24 brief conversations and ask you to tell me which ones you heard earlier. This should require no more that 15 minutes of your time.

Please be assured that your name will not appear on the data sheets and that all information will be confidential and restricted to research personnel. If at any time you wish to withdraw, you are free to do so and any information collected up until that time will be destroyed. Refusal to participate or withdrawing later on will not have

Appendix F (continued)

any effect on how you are treated here. This is entirely your decision and has nothing to do with the nursing staff here.

Thank you for your time.

Sincerely,

B. Gwenn Terletski

---

I understand the methods of this project and agree to participate. I understand that all information will be confidential and that I can withdraw from the project at any time.

Name of Resident (please print): _____

Signature of Resident: _____

Date: _____

## Appendix G

Table G-1

List of Participant Diagnoses

| Age | Sex | Diagnoses |
|---|---|---|
| | | Low Impairment |
| 83 | Female | Senile dementia of the Alzheimer type |
| 85 | Male | Senile dementia of the Alzheimer type |
| 85 | Female | Senile dementia of the Alzheimer type |
| 89 | Female | Senile dementia of the Alzheimer type |
| 83 | Female | Senile dementia |
| 82 | Male | Dementia |
| 79 | Female | Dementia |
| 79 | Female | Dementia |
| 76 | Female | Dementia |
| 79 | Male | Dementia |
| 73 | Female | Dementia |

Appendix G (continued)

| | | |
|---|---|---|
| 73 | Female | Organic brain syndrome |
| 82 | Female | Organic brain syndrome |
| 76 | Female | Alzheimer's disease |
| 80 | Female | Alzheimer's disease |
| 83 | Male | Alzheimer's disease |
| 87 | Female | Alzheimer's disease |
| 70 | Female | Alzheimer's disease |

---

High Impairment

| | | |
|---|---|---|
| 81 | Female | Senile dementia of the Alzheimer type |
| 91 | Male | Senile dementia of the Alzheimer type |
| 80 | Female | Senile dementia of the Alzheimer type |
| 80 | Male | Senile dementia |
| 80 | Male | Senile dementia |
| 93 | Male | Organic brain syndrome |
| 92 | Female | Organic brain syndrome |
| 88 | Female | Organic brain syndrome |

Appendix G (continued)

| | | |
|---|---|---|
| 80 | Female | Organic brain syndrome |
| 83 | Male | Organic brain syndrome |
| 84 | Female | Organic brain syndrome |
| 81 | Male | Organic brain syndrome |
| 73 | Female | Alzheimer's disease |
| 85 | Female | Alzheimer's disease |
| 76 | Female | Alzheimer's disease |
| 87 | Male | Alzheimer's disease |
| 76 | Female | Alzheimer's disease |
| 69 | Male | Alzheimer's disease |

Appendix H

Selection Criteria

Individuals will be accepted for participation if they have the following diagnoses: 1) organic/chronic brain syndrome/disease: 2) senile dementia: 3) senile dementia of the Alzheimer's type; 4) senility; 5) dementia.

Individuals will not be accepted for participation if they have the following diagnoses: 1) depression; 2) epilepsy: 3) stroke or cerebral vascular accident; 4) hydrocephalus; 5) psychoses; 6) alcohol or drug abuse.

Individuals also will not be included in the study if the following medical/physical conditions exist: 1) unusual behaviours; 2) medications that are known to potentially cause anxiety, confusion, delusions or hallucinations; 3) eyesight or hearing insufficient for viewing a television screen; 4) painful physical conditions that may interfere with attention abilities; 5) any other medical/physical/psychological conditions that may interfere with testing.

Appendix I

Table I-1

Level by Subgroup Assignations

| Subgroup 1 | | | | Subgroup 2 | | | | Subgroup 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low Impairment | | | | | | | |
| Age | Sex | Edu | MMSE Score | Age | Sex | Edu | MMSE Score | Age | Sex | Edu | MMSE Score |
| 82 | M | 11 | (15) | 85 | F | 8 | (15) | 87 | F | 10 | (14) |
| 83 | F | 9 | (15) | 76 | F | 9 | (15) | 89 | M | 10 | (15) |
| 83 | F | 12 | (14) | 73 | F | 10 | (16) | 79 | M | 10 | (16) |
| 79 | F | 10 | (18) | 80 | F | 9 | (18) | 73 | F | 11 | (18) |
| 79 | M | 9 | (20) | 85 | F | 8 | (17) | 83 | F | 10 | (17) |
| 76 | F | 10 | (21) | 83 | M | 11 | (21) | 70 | F | 12 | (23) |
| x = 80.3 | | 10.2 | (17.1) | 80.3 | | 9.2 | (17.0) | 80.0 | | 10.2 | (17.1) |

Appendix I (continued)

High Impairment

| Age | Sex | Edu | MMSE Score | Age | Sex | Edu | MMSE Score | Age | Sex | Edu | MMSE Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 93 | M | 6 | (13) | 91 | M | 9 | (13) | 87 | M | 8 | (13) |
| 92 | F | 7 | (11) | 85 | F | 11 | (11) | 76 | F | 12 | (11) |
| 81 | F | 10 | (10) | 80 | F | 9 | (10) | 84 | F | 8 | (10) |
| 69 | M | 10 | (13) | 83 | M | 11 | (13) | 81 | M | 12 | (10) |
| 80 | M | 9 | (07) | 80 | M | 9 | (09) | 80 | F | 9 | (11) |
| 73 | F | 10 | (09) | 76 | F | 12 | (07) | 88 | F | 10 | (08) |
| x= 81.0 | | 8.7 | (10.5) | 82.5 | | 10.1 | (10.5) | 82.6 | | 9.5 | (10.5) |

# Appendix J

## Ethics Approval Forms

University of Alberta
Edmonton
Canada T6G 2E9

Department of Psychology
P-220 Biological Sciences Building Telephone: (403) 492-5216
Fax: (403) 492-1768

**TO:** GWENN TERLETSKI
AL DOBBS

**FROM:** Professor E. Cornell
Chair, University of Alberta Ethics Review Committee
(Department of Psychology: Faculties of Arts and Science)

**DATE:** 22 JULY 1993

**SUBJECT:** **Research proposal entitled** TESTING AFFECTIVE MEMORY IN COGNITIVELY IMPAIRED NURSING HOME RESIDENTS

X The project outlined in the application was found to be acceptable on ethical grounds and to be generally in accord with University and Department guidelines for research involving human participants.

____ Certification for funding agencies is attached and you can now forward your application materials, with appropriate signatures, to the Research Office (University Hall).

____ The project outlined in the application was not found to be acceptable on ethical grounds. Please see attached explanation.

____ Please provide _____ additional copies of all materials to facilitate the review process.

____ Additional information is required before a decision can be made. Please see attached request.

____ Please see the attached comments of one or more of the reviewers regarding your proposal.

____ _____

_____

EHC

cec

Appendix J (continued)

JUL 20 '93 11:47 SVDPOST0483-256-9016 P.2/12

**DEPARTMENT OF PSYCHOLOGY**

***APPLICATION TO CONDUCT RESEARCH***

| PRINCIPAL INVESTIGATOR'S NAME AND PHONE NUMBER: | CO- OR JUNIOR INVESTIGATOR NAME(S) AND PHONE NUMBER(S): |
|---|---|
| B. GWENN TERLETSKI (403) 254-2527 | DR. AL DOBBS (403) 492-5990 |

NAMES AND PHONE NUMBERS OF ALL PERSONS INVOLVED IN DATA ACQUISITION (EXPERIMENTERS, RESEARCH ASSISTANTS, ET

Same as above

PROJECT TITLE:

Testing Affective Memory in Cognitively Impaired Nursing Home Residents

LOCATION(S) WHERE RESEARCH WILL BE CONDUCTED:

Grand View Nursing Home ; Chinook Lodge

PARTICIPANTS/SOURCES OF DATA (CHECK APPROPRIATE ONE):

☐ PSYCO 104/105 research participants for course credit.

☐ Public/Separate school students

☑ Other: Describe in detail (a) source of participants/data, (b) significant participant characteristics (e.g., age, institutionalization, physical/mental health, etc.), and (c) other sources from which you have gained approval (attach documentation). Use separate sheets as necessary. A minimum of 30 nursing-home-dwelling elderly with a primary diagnosis of dementia will participate.

FACULTY SPONSORSHIP STATEMENT: I have read the responsibilities set out for Faculty Sponsors of research in the Human Ethics Review: 1995-96 document, Section VI-I, and agree to discharge those obligations with respect to this project.

7-20-93 — [signature] →

DATE — FACULTY SPONSOR SIGNATURE

Dr. A. R. Dobbs

PRINTED OR TYPED NAME

APPLICANT: Complete if project grants credit for PSYCO 104 or 105

1. Number of participants required: _____
2. Number of credits per participant: _____
3. Restrictions on participation (e.g., sex, handedness, course number, assessment instrument scores, etc.) and justification:

PLEASE ATTACH COPY OF PROPOSED RESERVE ARTICLE

**FOR OFFICE USE ONLY**

| PROJECT NUMBER: | PROJECT CODE NAME: |
|---|---|
| LIBRARY CODE NAME: | ETHICS APPROVAL: DATE: |
| CONDITIONS: | |

CONTINUED ON OTHER SIDE

## Appendix J (continued)

**INSTRUCTIONS:** Please carefully complete each section. Write "nil" or "N/A" (not applicable) rather than leaving a space. Use additional sheets as necessary.

1. Full description of procedure.

   - please see attached.

2. Discuss from whom and how informed consent is obtained, and how continuing voluntariness of participation is For participants not obtained through the PSYCO 104/105 system, please describe the manner in which p will be solicited (attach copies of printed advertisements, transcripts of oral solicitations, etc.) and the Inducements/promises offered for participation.

   - please see attached.

3. If concealment and/or deception is employed, provide justification. Discuss how and when participants will be of such concealment and/or deception.

   N/A

4. Describe how you will grant anonymity to participants and how responses will be kept confidential. If identifying information are coded with data, describe how access to data is limited and safeguarded. In have access. If appropriate, describe how consent is obtained from participants for anonymity/confidentiality. If data are to be taken from existing sources, discuss the implications of pre- or explicit) guarantees of confidentiality/anonymity.

   All data will be coded + confined to research personnel. Only group data will be

5. Describe the nature of any risks to the physical or psychological well-being or integrity of participants from your procedures; and discuss your justifications, safeguards, and resolutions for these risks where

   There are no perceived risks because the test stimuli are innocuous conversations about common events that are spoken with no emotion, anger, or happiness. However, because this population may be affected by events internal to the test environment (eg. had a bad night), they will be monitored for [illegible] etc. + testing will cease when such is apparent. (Please refer to # 8 for further details re: how participants are

6. Indicate when participants will be debriefed, and provide a complete transcript of your debriefing.

   please see attached.

7. Describe any apparatus, element of the physical environment, substance or other materials that could cause a participant if a malfunction, misuse, accident, allergic reaction, or side-effect were to occur. If the participant into contact with a potentially hazardous apparatus or material, who is responsible for checking for defects and schedule are inspections made? When was the last inspection made? If participants taste, ingest, them, or come into contact with some substance that could cause harm, please document your safeguards.

   N/A

8. Describe qualifications of research personnel if special conditions exist within the research that could cause or psychological harm or if participants require special attention because of physical or psychological or if made advisable by other exigencies.

   Special attention is always given because of particular characteristics please see attached for details.

9. Describe any potentially hazardous duties that will be required of research personnel, including physical risks. Describe the safeguards you have implemented for your personnel.

   N/A

10. Please attach copies of any questionnaire, interview schedule, test, stimulus materials, and other such for competent review of your application.

    A copy of the Folstein, Folstein, + McHugh (MMSE) questionnaire is attached as well as a copy of the 24 test conversations. (Appendix D)

Appendix J (continued)

B. Gwenn Terletski

DEPARTMENT OF PSYCHOLOGY

APPLICATION TO CONDUCT RESEARCH

1. Procedures:

Prior to any testing, the experimenter will spend sufficient time in the nursing home to develop a positive rapport/trust relationship with the residents. A positive environment will be maintained throughout testing. In past experiences, this procedure has resulted in greater willingness to participate and increased coefort of the participant during testing.

The "Mini Mental Status Examination" (MMSE) by Folstein, Folstein and McHugh (1975) will be administered to participants to determine level of cognitive impairment (see Appendix A). These individuals will then be separated into 2-3 groups, depending on level of impairment. Participants will be as closely matched as possible for age, sex, and education across all levels of impairment.

Later that day or on another day, the experimental task will be administered to each individual. Participants will be informed that they are going to view a videotape of two people who are talking about different things common to everyday life. They will also be informed that the television screen will go black for a short time between each conversation. Participants will be instructed to listen carefully, because later the experimenter will show them another videotape of the same two people talking and ask whether or not they heard each conversation earlier. The learning phase of the task will then be shown. Following a 45 minute delay, in which participants will engage in normal daily activities, they will individually view a videotape of the 24 test items and be asked to select the target stimuli from distractors, by verbal response ("yes"/"no"). A target will be shown with a distractor and the participant will choose the item viewed earlier. Then they will be asked to select which of the two they prefer. The same procedure will then occur for the subsequent pairs until completion. The experimenter will escort participants to and from the test area, which will be a room they are familiar with on their own floor. At the end of testing, after the participant has been debriefed, the experimenter will ensure the person is calm and comfortable before leaving them.

2. Informed Consent:

Nursing home administrators will be contacted first by phone, then in person to outline the project. They will be shown both the guardian and participant consent forms (see Appendix B and C) as explanation, and elaborations will be given on any aspect if requested or deemed beneficial. If consent is granted, guardians of potential participants will be contacted by phone, then letter or in person, to provide them with a consent form that outlines the methods and procedures. Telephone script will closely follow "Guardian Consent Form" script. There is no obligation to participate and refusal to do so will not jeopardize care or treatment of guardians or participants. Even if consent is granted, withdrawal is permissible at any point, and all gathered data will be destroyed.

Appendix J (continued)

B. Gwenn Terletski-Application to Conduct Research (cont'd)

6. Debriefing Script:

Thank you for helping me with this project. Your participation will help me to understand whether people remember conversations better if spoken with feeling. I hope you enjoyed it. I certainly enjoyed spending time with you. Thanks again. Have a great day.

8. Qualifications:

The research project will not cause any harm to participants. I have worked with cognitively impaired nursing home elderly for 3 years in a research capacity, and 2 years with other special populations, therefore, I am very conscientious of their needs. While a positive rapport is being established with participants, nursing staff will be queried as to any behaviours that indicate each person is anxious, upset, over-tired, etc. Any individuals that are prone to anxious outbursts of any sort will be excluded from the study. On the day of testing, nursing staff will be asked about the general physical and psychological well-being of participants. If they are believed to be upset, or tired, etc., testing will be postponed. If the nurses report no such difficulties, and none are observed, testing will commence. However, the experimenter will watch for any of the known behavioural indicants of anxiety, etc. relevant to that individual. Participants will also be monitored for other verbal (e.g. words, noises) and/or nonverbal (e.g. rocking back and forth, tenseness of body) signs of distress that are common among this population. Testing will cease at any point any of these signs are observed, before they can escalate. The experimenter will then ask the participant if they would like to leave and come back later, or withdraw from the study, or whatever seems relevant (determined on an individual basis). The voice used will be soothing and reassuring that "all is well" and that they do not have to participate at this time or any other time if they so choose.

Appendix J (continued)

Department of Psychology

Application to Conduct Research

APPENDIX A

"MINI MENTAL STATUS EXAMINATION"

| Total Score | Score | |
|---|---|---|
| | | **Orientation** |
| 5 | ( ) | What is the (year)(season)(date)(day)(month)? |
| 5 | ( ) | Where are we: (province)(country)(town)(nursing home) (floor)? |
| | | **Registration** |
| 3 | ( ) | Name 3 objects: 1 second to say each. Then ask the person all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he learns all 3. Count trials and record. |
| | | **Attention and Calculation** |
| 5 | ( ) | Serial 7's. 1 point for each correct. Stop after 5 answers. Alternatively spell "world" backwards. |
| | | **Recall** |
| 3 | ( ) | Ask for the 3 objects repeated above. Give 1 point for each correct. |
| | | **Language** |
| 2 | ( ) | Name a pencil and watch (1 point each) |
| 1 | ( ) | Repeat the following: "No ifs, ands or buts." |
| 3 | ( ) | Follow a 3 stage command: "Take a paper in your right hand, fold it in half and put it on the floor" |
| 1 | ( ) | Read and obey the following: "Close your eyes" |
| 1 | ( ) | Write a sentence |
| 1 | ( ) | Copy design |
| _____ | | TOTAL SCORE |